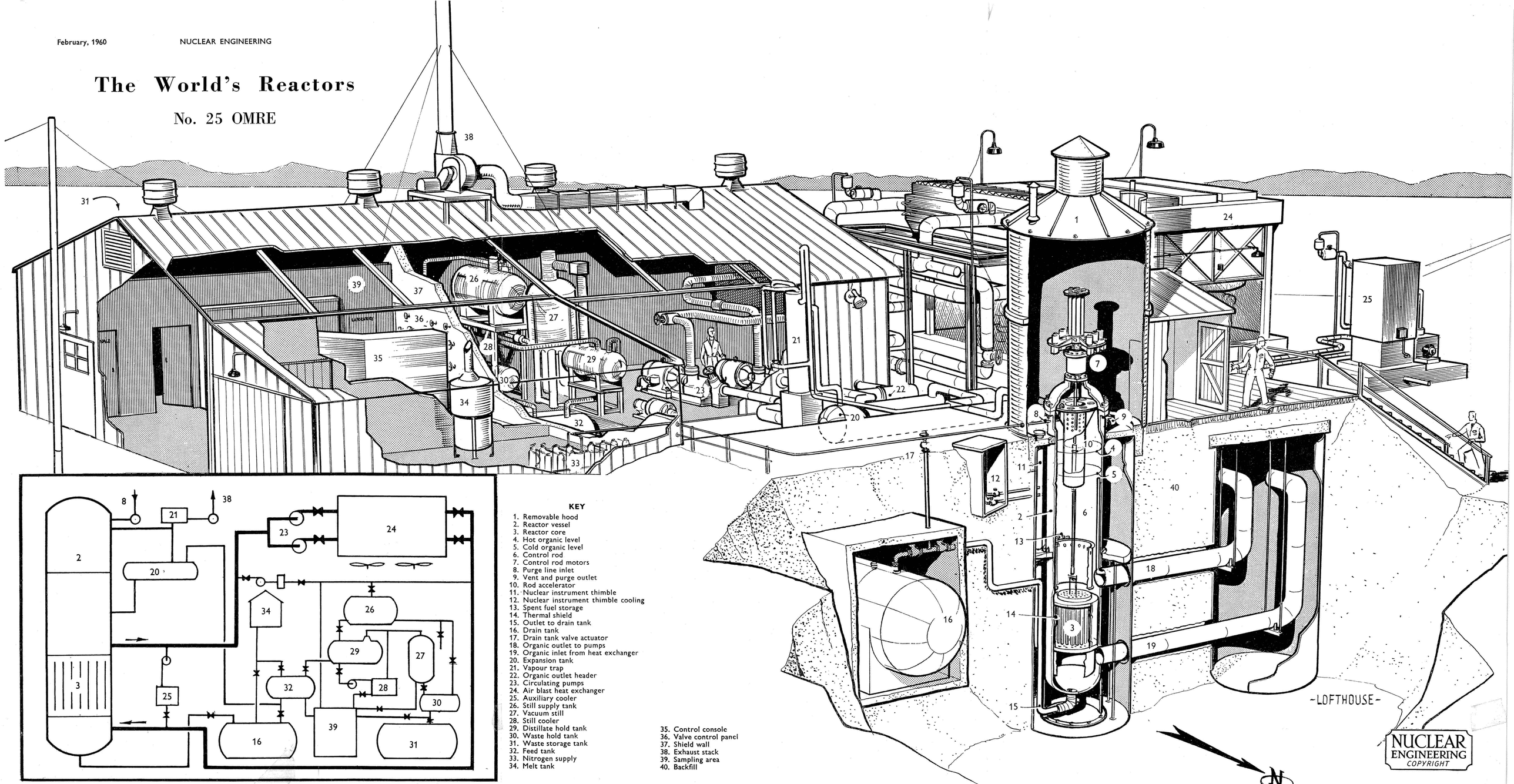
The World's Reactors

No. 25 OMRE



KEY

1. Removable hood
2. Reactor vessel
3. Reactor core
4. Hot organic level
5. Cold organic level
6. Control rod
7. Control rod motors
8. Purge line inlet
9. Vent and purge outlet
10. Rod accelerator
11. Nuclear instrument thimble
12. Nuclear instrument thimble cooling
13. Spent fuel storage
14. Thermal shield
15. Outlet to drain tank
16. Drain tank
17. Drain tank valve actuator
18. Organic outlet to pumps
19. Organic inlet from heat exchanger
20. Expansion tank
21. Vapour trap
22. Organic outlet header
23. Circulating pumps
24. Air blast heat exchanger
25. Auxiliary cooler
26. Still supply tank
27. Vacuum still
28. Still cooler
29. Distillate hold tank
30. Waste hold tank
31. Waste storage tank
32. Feed tank
33. Nitrogen supply
34. Melt tank
35. Control console
36. Valve control panel
37. Shield wall
38. Exhaust stack
39. Sampling area
40. Backfill

The World's Reactors

No. 25 OMRE

OWNER: The United States Atomic Energy Commission.

DESIGNER/OPERATOR: Atomics International, Division of North American Aviation, Inc.

LOCATION: National Reactor Testing Station, Arco, Idaho Falls.

TYPE: Thermal, heterogeneous.

PURPOSE: Experimental.

RATING: 16MW (thermal) max.

OPERATION: Diverged: September 17, 1957.
Full power operation commenced February, 1958.

FUEL: Enriched uranium oxide:

Critical mass	16.4 kg U^{235}.
Complete loading	25.5 kg U^{235}.

FUEL ELEMENTS: Box type 2.8 in. × 2.9 in. × 36 in. active length, consisting of 16 active plates spaced 0.134 in. apart. Plates consist of enriched UO_2-stainless steel matrix 0.020 in. thick clad with stainless steel 0.005 in. thick.

MODERATOR: Organic liquid (above 200°F) of composition:

Diphenyl	16.0%.
Ortho-terphenyl ..	46.1%.
Meta-terphenyl ..	31.8%.
Para-terphenyl ..	6.1%.

CORE: Square lattice: 4.5 in. centres in 7 rows of 3, 5, 7, 7, 7, 5, 3 element positions forming cruciform shape with 37 positions.
Actual number of active elements: 31.

CONTROL: 12 control and safety rods, symmetrically located between the elements, each consisting of $1\frac{1}{4}$ in. steel tube loaded for 36 in. with compacted boron carbide powder. Rods are driven in pairs through rack and pinion, one pair being used as regulating rods.

REACTIVITY: 7.87 $\Delta k/k$ at 250°F.
8.76% $\Delta k/k$ at 450–480°F.
7.82% $\Delta k/k$ at 700°F.
Shutdown reactivity at 250°F.:

All rods in	−8.2% $\Delta k/k$.
2 inner pairs withdrawn	−2.62% $\Delta k/k$.
Equilibrium xenon and samarium ..	−3.88% $\Delta k/k$.
Fuel burn-up	−3.94% $\Delta k/k$.

FLUX: Max. (thermal) at 700°F and 35% high boiler content in moderator: 2.1×10^{13} n/cm², sec.

COOLANT: Moderator liquid:

Operating temperature ..	500–700°F.
Operating pressure	200 p.s.i.a.
Velocity through core ..	15 ft/sec.
Max. coolant flow	7200 gal/min.

PRESSURE VESSEL: Steel ($\frac{1}{2}$% Mo, 1% Cr): 1 in. thick.
Diameter (internal): 4 ft 6 in.
Height: 28 ft.
Design pressure: 400 p.s.i.

SECONDARY COOLER: Air blast heat exchanger (finned-tube type) in two sections cooled by two fans with capacity of 1,150,000 lb/h.

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